

IN THE CLAIMS

Please amend the claims as follows:

Claim 1 (Original): A guidance information providing apparatus comprising:

- a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of the passage;
- a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;
- an input unit which inputs a departure place and destination;
- a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;
- a viewpoint setting unit which sets a plurality of viewpoint position candidates for visualizing the guiding route in the target area expressed in the three-dimensional shape data;
- an evaluation unit which obtains an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route in the target area expressed in the three-dimensional shape data;
- an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from the plurality of viewpoint position candidates on the basis of the evaluation value of visibility and by projecting the three-dimensional shape data from the determined viewpoint position; and
- a presentation unit configured to present the generated information map to a user.

Claim 2 (Original): A guidance information providing apparatus comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

an input unit which inputs a departure place and destination;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a viewpoint position for visualizing the guiding route in the target area expressed in the three-dimensional shape data;

a deformation unit which deforms the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route in the target area expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by projecting the deformed three-dimensional shape data; and

a presentation unit configured to present a user with the information map generated by the information map generating unit.

Claim 3 (Original): A guidance information providing apparatus comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

an input unit which inputs a departure place and destination;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data; a viewpoint setting unit which sets a viewpoint position for the guiding route expressed in the three-dimensional shape data;

a deformation unit which performs a plurality of deformation processes for deforming the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates;

an evaluation unit which obtains an evaluation value of visibility, from the selected viewpoint position, of each of the route deformation candidates expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by determining route deformation for generating the information map from said plurality of route deformation candidates on the basis of the evaluation value of visibility of each of the route deformation candidates and by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route deformation; and

a presentation unit configured to present the generated information map.

Claim 4 (Original): A guidance information providing apparatus comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area; an input unit which inputs a departure place and destination;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a plurality of viewpoint positions candidates for visualizing the guiding route expressed in the three-dimensional shape data;

a deformation unit which deforms the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route in the target area expressed in the three-dimensional shape data;

an evaluation unit which obtains an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route in the target area expressed in the deformed three-dimensional shape data;

an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the evaluation values of visibility and by projecting the deformed three-dimensional shape data from the determined viewpoint position; and

a presentation unit configured to present a user with the information map generated by the information map generating unit.

Claim 5 (Original): A guidance information providing apparatus comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

an input unit which inputs a departure place and destination;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a plurality of viewpoint positions candidates for expressing and visualizing the guiding route in the three-dimensional shape data;

a deformation unit which performs a deformation process for deforming the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

an evaluation unit which obtains an evaluation value of visibility, from each of the viewpoint position candidate, of each of the route deformation candidates expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates and route deformation for generating the information map from said plurality of route deformation candidates on the basis of the obtained evaluation values of visibility, and by projecting, from the determined viewpoint position, the three-dimensional shape data subjected to the route deformation; and

a presentation unit configured to present a user with the information map generated by the information map generating unit.

Claim 6 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting and deleting a portion which obstructs the guiding route from the three-dimensional shape data stored in the second memory.

Claim 7 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting and deleting a portion representing a floor which does not include any of the departure place, destination, and guiding route from the three-dimensional data.

Claim 8 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting and deleting a portion representing a region which does not include any of the departure place, destination, and guiding route from the three-dimensional data.

Claim 9 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a portion representing a floor which obstructs the guiding route from the three-dimensional data, and moving the portion by a predetermined distance in a predetermined direction.

Claim 10 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a portion representing a floor which obstructs the guiding route, and a portion representing an obstructed floor, from the three-dimensional data, and rotating the portions by a predetermined angle around a predetermined axis.

Claim 11 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a portion representing a floor which obstructs the guiding route from the three-dimensional data, and curving the portion in a predetermined form.

Claim 12 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a floor including a portion positioned far from a viewpoint from the three-dimensional data, and rotating the floor by a predetermined angle around a predetermined axis.

Claim 13 (Original): An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a floor including a portion positioned far from a viewpoint from the three-dimensional data, and curving the floor in a predetermined form.

Claim 14 (Original): An apparatus according to claim 5, wherein the deformation unit selects a type of deformation process to be performed on the basis of a size of the information map.

Claim 15 (Original): An apparatus according to claim 5, wherein the deformation unit selects a type of deformation process to be performed on the basis of an evaluation value of visibility, from the viewpoint position, of the guiding route expressed in the three-dimensional data.

Claim 16 (Original): An apparatus according to claim 5, wherein the deformation unit selects a type of deformation process to be performed on the basis of an instruction from a user.

Claim 17 (Original): An apparatus according to claim 5, wherein if a guiding route included in a generated information map has a partial route having the visibility evaluation

Application No. 10/743,829
Reply to Notice of Allowance of October 21, 2005

value which does not satisfy a predetermined reference value, the information map generating unit adds, to the information map, information indicating a supplementary explanation related to the partial route.

Claim 18 (Original): An apparatus according to claim 5, wherein if a guiding route included in a generated information map has a partial route having the visibility which does not satisfy a predetermined reference value, the information map generating unit splits the information map from the partial route.

Claim 19 (Original): An apparatus according to claim 5, wherein the evaluation unit obtains an evaluation value of visibility of a route surface of a route of the guiding route, except for a route connecting floors, on the basis of a size of a visible projected area.

Claim 20 (Original): An apparatus according to claim 19, wherein the evaluation unit obtains an evaluation value of visibility of a virtual route surface, which is formed perpendicularly to a route connecting floors, of the guiding route, on the basis of a size of a visible projected area.

Claim 21 (Original): An apparatus according to claim 5, wherein polygon mesh data is used as the three-dimensional shape data.

Claim 22 (Original): A guidance information providing method to provide guidance information, comprising:

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point

of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

setting a plurality of viewpoint position candidates for visualizing the guiding route expressed in the three-dimensional shape data;

obtaining an evaluation value of visibility, from each viewpoint position candidate, of the guiding route in the target area expressed in the three-dimensional shape data;

determining a viewpoint position for generating the information map from the plurality of viewpoint position candidates, on the basis of the evaluation value of visibility from each viewpoint position candidate;

generating the information map by projecting the three-dimensional shape data from the determined viewpoint position; and

presenting the generated information map to a user.

Claim 23 (Currently Amended): A guidance information providing method comprising[[],]:

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

setting a viewpoint position for visualizing the guiding route expressed in the three-dimensional shape data;

deforming the three-dimensional shape data so as to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data;

generating the information map by projecting the deformed three-dimensional shape data; and

presenting a user with the information map generated by the information map generating unit.

Claim 24 (Currently Amended): A guidance information providing method comprising[[],]:

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

setting a viewpoint position for the guiding route expressed in the three-dimensional shape data;

performing a plurality of deformation processes for the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates;

obtaining an evaluation value of visibility, from the selected viewpoint position, of each of the route deformation candidates expressed in the three-dimensional shape data; determining route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the evaluation value of visibility of each of the route deformation candidates; generating the information map by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route deformation; and presenting the generated information map.

Claim 25 (Currently Amended): A guidance information providing method comprising[[],]:

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

setting a plurality of viewpoint positions for visualizing the guiding route expressed in the three-dimensional shape data;

deforming the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data; obtaining an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route expressed in the deformed three-dimensional shape data;

Application No. 10/743,829
Reply to Notice of Allowance of October 21, 2005

determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates, on the basis of the evaluation values of visibility; generating the information map by projecting the deformed three-dimensional shape data from the determined viewpoint position; and presenting a user with the information map generated by the information map generating unit.

Claim 26 (Currently Amended): A guidance information providing method comprising[[],]:

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

setting a plurality of viewpoint positions for expressing and visualizing the guiding route in the three-dimensional shape data;

performing a deformation process for the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

obtaining an evaluation value of visibility, from each viewpoint position candidate, of each of the route deformation candidates expressed in the three-dimensional shape data;

determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates, and route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the obtained evaluation values of visibility;

generating the information map by projecting, from the determined viewpoint position, the three-dimensional shape data subjected to the route deformation; and

presenting a user with the information map generated by the information map generating unit.

Claim 27 (Original): A computer program product storing a program for allowing a computer to function as a guidance information providing apparatus, the computer program product including:

means for storing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

means for inputting a departure place and destination;

means for searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

means for setting a plurality of viewpoint position candidates for visualizing the guiding route expressed in the three-dimensional shape data;

means for obtaining an evaluation value of visibility, from each viewpoint position candidate, of the guiding route expressed in the three-dimensional shape data;

means for determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates, on the basis of the evaluation value of visibility from each viewpoint position candidate;

means for generating the information map by projecting the three-dimensional shape data from the determined viewpoint position; and

means for presenting the generated information map to a user.

Claim 28 (Currently Amended): A computer program product storing a program for allowing a computer to function as a guidance information providing apparatus, the computer program product including:

means for storing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

means for inputting a departure place and destination;

means for searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

means for setting a viewpoint position for visualizing the guiding route expressed in the three-dimensional shape data;

means for deforming the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data;

means for generating the information map by projecting the deformed three-dimensional shape data; and

a presenting function which presents a user with the information map generated by the information map generating unit.

Claim 29 (Original): A computer program product storing a program for allowing a computer to function as a guidance information providing apparatus, the computer program product including:

means for storing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

means for inputting a departure place and destination; means for searching for a guiding route connecting the input departure place and destination on the basis of the network data;

means for setting a viewpoint position for the guiding route expressed in the three-dimensional shape data;

means for performing a plurality of deformation processes for the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates;

means for obtaining an evaluation value of visibility, from the selected viewpoint position, of each of the route deformation candidates expressed in the three-dimensional shape data;

means for determining route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the evaluation value of visibility of each of the route deformation candidates;

means for generating the information map by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route deformation; and a presenting function which presents the generated information map.

Claim 30 (Currently Amended): A computer program product storing a program for allowing a computer to function as a guidance information providing apparatus, the computer program product comprising:

means for storing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

means for inputting a departure place and destination; means for searching for a guiding route connecting the input departure place and destination on the basis of the network data;

means for selecting a plurality of viewpoint positions for visualizing the guiding route expressed in the three-dimensional shape data;

means for deforming the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data;

means for obtaining an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route expressed in the deformed three-dimensional shape data;

means for determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the evaluation values of visibility;

means for generating the information map by projecting the deformed three-dimensional shape data from the determined viewpoint position; and

means for presenting a user with the information map generated by the information map generating unit.

Claim 31 (Original): A computer program product storing a program for allowing a computer to function as a guidance information providing apparatus, the computer program product including:

means for storing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

means for inputting a departure place and destination;

means for searching for a guiding route connecting the input departure place and destination on the basis of the network data;

means for selecting a plurality of viewpoint positions for expressing and visualizing the guiding route in the three-dimensional shape data;

means for performing a deformation process for the three-dimensional shape data so as to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

means for obtaining an evaluation value of visibility, from each viewpoint position candidate, of each of the route deformation candidates expressed in the three-dimensional shape data;

means for determining a viewpoint position for generating the information map from the plurality of viewpoint position candidates, and route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the obtained evaluation values of visibility;

means for generating the information map by projecting, from the determined viewpoint position, the three-dimensional shape data subjected to the route deformation; and

means for presenting a user with the information map generated by the information map generating unit.

Claim 32 (Original): A server apparatus adapted to communicate with a client apparatus, comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

a receiving unit which receives a departure place and destination from the client apparatus as a request source;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a plurality of viewpoint position candidates to visualize the guiding route in the target area expressed in the three-dimensional shape data;

an evaluation unit which obtains an evaluation value of visibility, from each viewpoint position candidate, of the guiding route expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by determines a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the evaluation value of visibility from each viewpoint position candidate, and by projecting the three-dimensional shape data from the determined viewpoint position; and

a transmitting unit which transmits the generated information map to the client apparatus.

Claim 33 (Original): A server apparatus adapted to communicate with a client apparatus, comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

a receiving unit which receives a departure place and destination from the client apparatus as a request source;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination on the basis of the network data;

a viewpoint setting unit which sets a viewpoint position to visualize the guiding route in the target area expressed in the three-dimensional shape data;

a deformation unit which deforms the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by projecting the deformed three-dimensional shape data; and

a transmitting unit which transmits the generated information map to the client apparatus.

Claim 34 (Original): A server apparatus adapted to communicate with a client apparatus, comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

a receiving unit which receives a departure place and destination from the client apparatus as a request source;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a viewpoint position for the guiding route expressed in the three-dimensional shape data; a deformation unit which performs a plurality

of deformation processes for the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates;

an evaluation unit which obtains an evaluation value of visibility, from the selected viewpoint position, of each of the route deformation candidates expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by determining route deformation for generating the information map from said plurality of route deformation candidates on the basis of the evaluation value of visibility of each of the route deformation candidates, and by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route deformation; and

a transmitting unit which transmits the generated information map to the client apparatus.

Claim 35 (Original): A server apparatus adapted to communicate with a client apparatus, comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

a receiving unit which receives a departure place and destination from a client apparatus as a request source;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a plurality of viewpoint positions to visualize the guiding route expressed in the three-dimensional shape data;

a deformation unit which deforms the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data;

an evaluation unit which obtains an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route expressed in the deformed three-dimensional shape data;

an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the evaluation values of visibility, and by projecting the deformed three-dimensional shape data from the determined viewpoint position; and

a transmitting unit which transmits the generated information map to the client apparatus.

Claim 36 (Original): A server apparatus adapted to communicate with a client apparatus, comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

a receiving unit which receives a departure place and destination from a client apparatus as a request source;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination on the basis of the network data;

a viewpoint setting unit which sets a plurality of viewpoint positions for expressing and visualizing the guiding route in the three-dimensional shape data;

a deformation unit which performs a deformation process for the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

an evaluation unit which obtains an evaluation value of visibility, from each viewpoint position candidate, of each of the route deformation candidates expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates, and route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the obtained evaluation values of visibility, and by projecting, from the determined viewpoint position, the three-dimensional shape data subjected to the route deformation; and

a transmitting unit which transmits the generated information map to the client apparatus.